IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 3, March 2024

DOI: 10.17148/IARJSET.2024.11327

AIR POLLUTION DETECTION USING DEEP LEARNING

D. Tejaswi[1], V. Manjusha[2], M. Yamini Parvathi[3], S. Chandana Lakshmi Priya[4]

Assistant Professor in Department of CSE, Bapatla Women's Engineering College, Bapatla, India[1]

B. Tech, Computer Science & Engineering, Bapatla Women's Engineering College, Bapatla, India[2-4]

Abstract: As the world's population gets more urbanised, many of the fastest-growing cities are experiencing worsening air quality. According to a study, ambient air pollution concentrations are at a level where significant health consequences have been observed in 20 out of the 24 global megacities. Although it is commonly known that air pollution can have a substantial negative impact on agriculture, urban growth, and public health, there are evident gaps in the methods used by existing approaches to collect reliable data on air pollution.

Keywords: Convolutional Neural Network, AQI, ResNet-50, and air pollution levels

I. INTRODUCTION

Air pollution poses a significant threat to public health and the environment, making accurate and efficient detection methods crucial. With the rapid advancement of deep learning technology, there has been a growing interest in leveraging machine learning models to detect and analyze air pollution. These innovative approaches not only enable real-time monitoring of air quality but also provide valuable insights for effective pollution control strategies. People who are exposed to air pollution suffer from serious illnesses.

This is one of the main problems identified. Although it is very difficult to completely eliminate air pollution, it is possible to estimate pollution levels and persuade people to take the appropriate safety measures. The key innovation with ResNet was that it successfully enabled us to train extraordinarily deep neural networks with 150+ layers, which are more accurate. To forecast the Air Quality Index of a given input image, the proposed model is therefore created. In order to anticipate the pollution level of a chosen image, air pollution detection using Resnet-50 is employed.

II. BACKGROUND & RELATED WORK

Additionally, pollution may be the cause of more severe issues like global warming and climate change that impact everyone on the planet. Pollution from power plants, smoke exhaust from various vehicles, and smoke exhaust from industries are the main causes of damage to the quality of the air. In the last few years, numerous techniques and protocols have been developed and implemented to identify air pollution. Polluted photos are gathered from the environment using image processing techniques, and they are compared to footage that is free of pollution. The diffusion process has been completed from those photos, and the ratio factor is acquired to determine the pollution level.

These works represent a sample of the research efforts focused on utilizing deep learning for air pollution detection and prediction. They highlight the potential of deep learning techniques in addressing challenges related to air quality monitoring and management.

III. METHODOLOGY

A. Data Collection

By photographing a few locations in some regions, the dataset was constructed on that photos are included in the dataset.

B. Image Preprocessing

Collected dataset is pre-processed using binary segmentation to extract the features from images and to prepare them for feeding to the neural networks.

C. Developing Convolutional Neural Network

In this, we build resnet-50 model to predict the percentage of Air Quality Index Value.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 3, March 2024

DOI: 10.17148/IARJSET.2024.11327

D. Training and Testing

The model is trained with images in the collected dataset and also the real time images is tested by the selecting a random image from the dataset.

E. Result

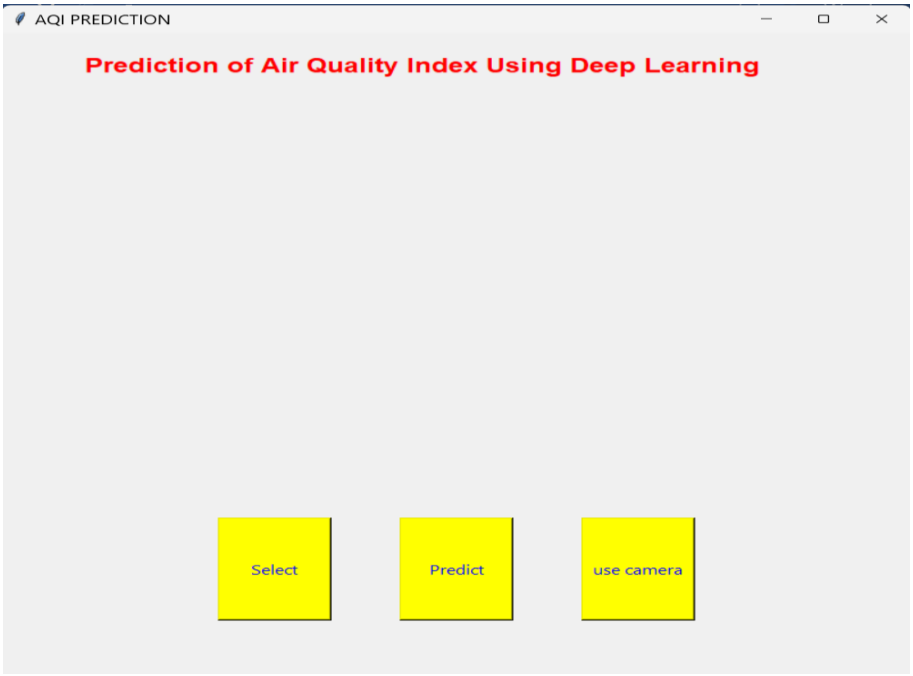

Fig. 1. window's Application

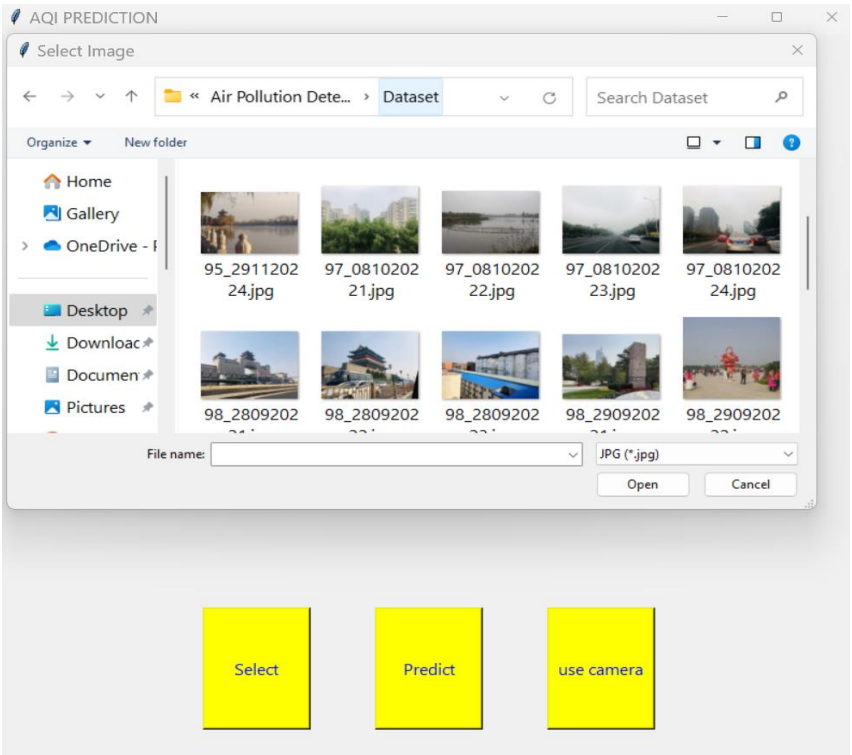

Fig. 2. Selecting image from Dataset

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 3, March 2024

DOI: 10.17148/IARJSET.2024.11327

Fig .3. selected image from Dataset

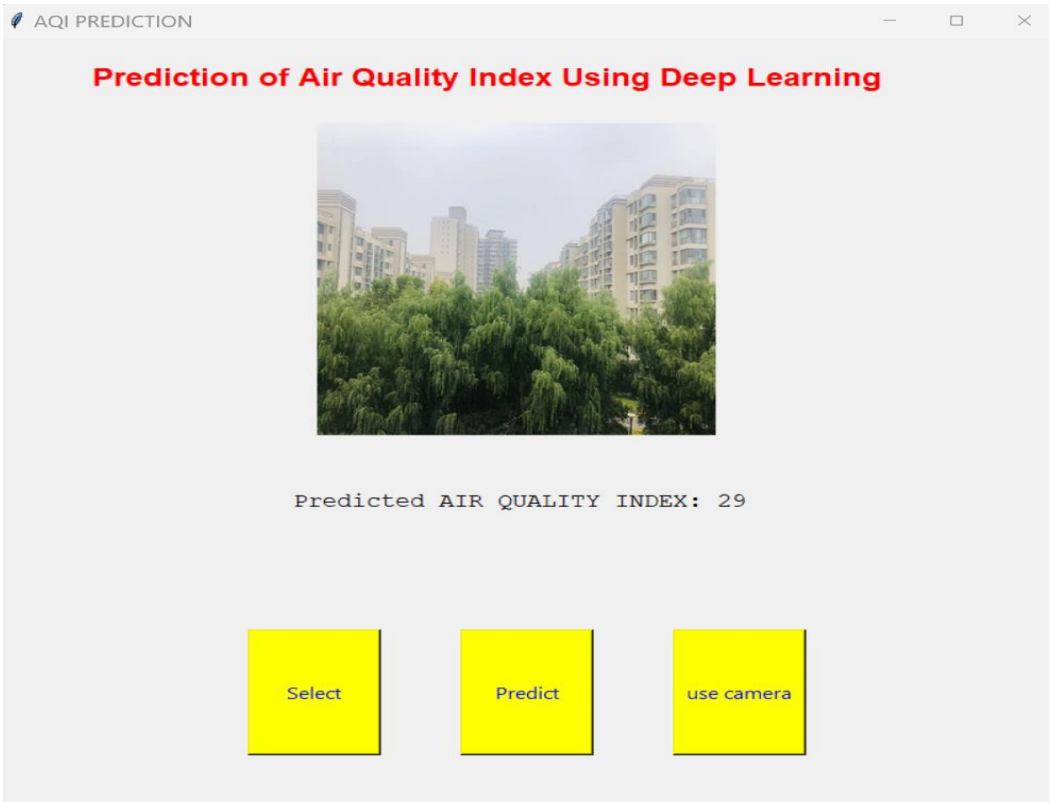

Fig. 4. Prediction of AQI value

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 3, March 2024

DOI: 10.17148/IARJSET.2024.11327

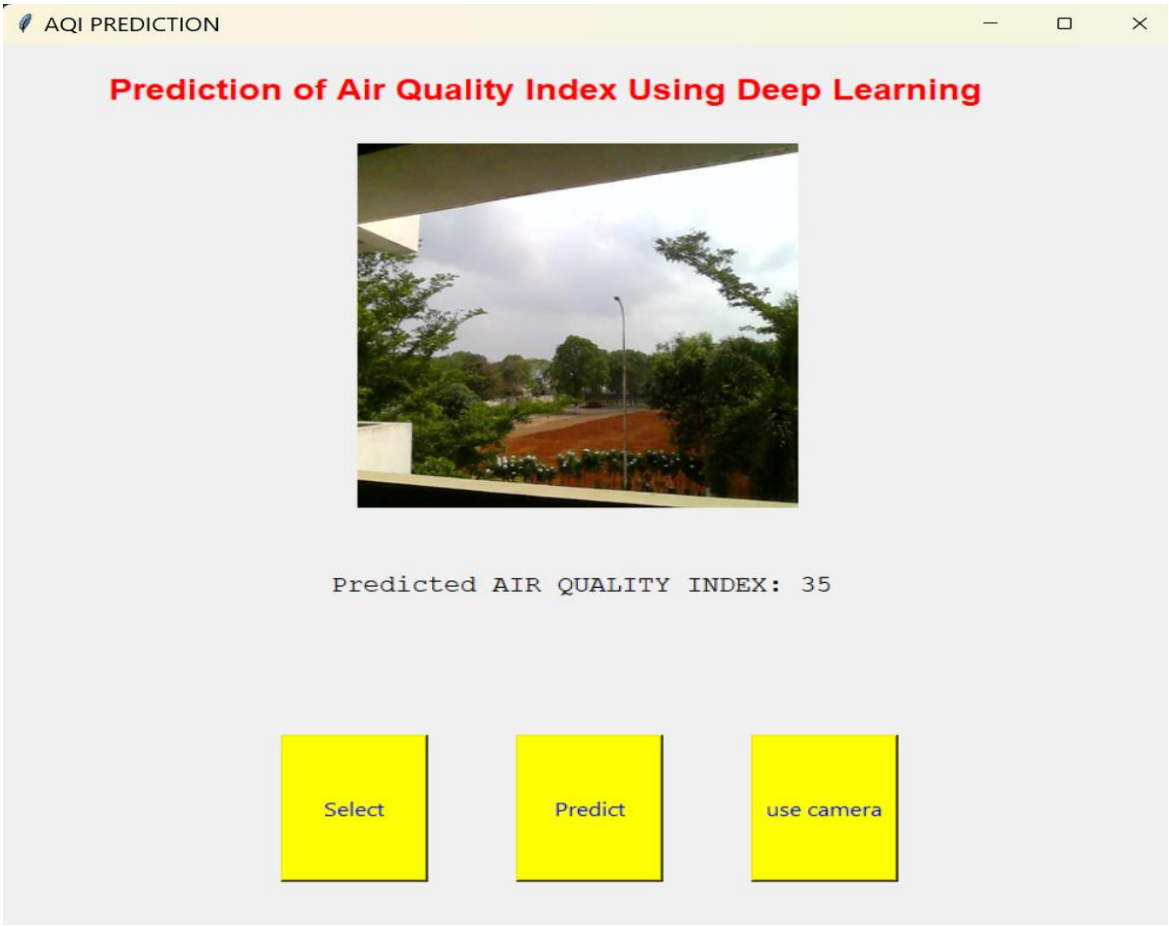

Fig. 5. Prediction of AQI By Capturing image

REFERENCES

[1]. J. Lee,"Acoustical perceptions of building occupants on indoor environment quality in naturally-ventilated building facades, "Journal of Acoustics, vol.4,no.3,2019.

[2]. K. Nahar, A. Jaradat, M. Atoum, and F. Ibrahim, "Sentiment analysis and classification of arab Jordanian facebook comments for jordanian telecom companies using lexicon-based approach and machine learning," Jordanian J. Comput. Inf. Technol., vol. 6, no. 03, pp. 247–263, 2020.

[3]. Chhikara P., Tekchandani R., Kumar N., Chamola V., and Guizani M., "Dcnn-ga: A deep neural net architecture for navigation of uav in indoor environment, " IEEE Internet of Things Journal, vol. 8, no. 6, pp. 4448–4460, 2021.

[4]. X. Lin, H. Wang, J. Guo and G. Mei, "A Deep Learning Approach Using Graph Neural Networks for Anomaly Detection in Air Quality Data Considering Spatiotemporal Correlations," in IEEE Access, vol. 10, pp. 94074-94088, 2022, DOI: 10.1109/ACCESS.2022.3204284.

[5]. Fatima Ezzahra Mana, Blaise Kévin Guépié, Raphaèle Deprost, Eric Herber, Igor Nikiforov, "The air pollution monitoring by sequential detection of transient changes", IFAC-papers online, Volume 55, Issue 5,2022, Pages 60-65, ISSN 2405-8963,https://doi.org/10.1016/j.ifacol.2022.07.640.

[6]. M. Molinara, M. Ferdinandi, G. Cerro, L. Ferrigno and E. Massera, "An End to End Indoor Air Monitoring System Based on Machine Learning and SENSIPLUS Platform," in IEEE Access, vol. 8, pp. 72204-72215, 2020, doi: 10.1109/ACCESS.2020.2987756

[7]. Z. J. Andersen, L. C. Kristiansen, K. K. Andersen, T. S. Olsen, M. Hvid-berg, S. S. Jensen, et al., "Stroke and Long-Term Exposure to Outdoor Air Pollution From Nitrogen Dioxide", Stroke, vol. 43, no. 2, pp. 320-325, 2019.

[8]. Z. Li et al., "Practical deployment of an in-field soil property wireless sensor network", Comput. Standards Interfaces, vol. 36, no. 2, pp. 278-287, 2019

[9]. Chuanqi, X. et al. Air pollutant spatiotemporal evolution characteristics and effects on human health in North China. Chemosphere 294, 0045–6535 (2022).

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 3, March 2024

DOI: 10.17148/IARJSET.2024.11327

BIOGRAPHY

Dhulipalla Tejaswi working as Assistant Professor in Department of CSE, Bapatla Women's Engineering College. She completed her M. Tech in Computer Science Engineering from Bapatla Engineering College, Bapatla. She has 6 years of Teaching Experience in various Engineering colleges.

Vattikuti Manjusha B.Tech with Specialization of Computer Science and Engineering in Bapatla Women's Engineering college, Bapatla.

Moparthi Yamini Parvathi B. Tech with Specialization of Computer Science and Engineering in Bapatla Women's Engineering college, Bapatla.

Salagala Chandana Lakshmi Priya B. Tech with Specialization of Computer Science and Engineering in Bapatla Women's Engineering college, Bapatla.